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EXAMINER	
BHAT, NARAYAN KAMESHWAR	
ART UNIT	PAPER NUMBER
1634	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/525,714	SEGAWA ET AL.	
	Examiner	Art Unit	
	NARAYAN K. BHAT	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-31* is/are pending in the application.

4a) Of the above claim(s) *22,23 and 31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-21 and 24-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 12, 2008 has been entered.

Status of the Claims

2. This action is in response to papers filed on November 12, 2008.

3. Claims 8, 18 and 24 were amended.

4. The previous rejections under 35 USC § 102 (b) and 103 (a) not reiterated below have been withdrawn in view of claim amendments. Applicant's arguments filed on September 29, 2008 have been fully considered and addressed following rejections.

5. Claims 3-31 are pending in this application.

6. Claims 3-21 and 24-30 are under prosecution.

Amendments to the Claims

7. Amendments to the claims 8, 18 and 24 have been reviewed and entered.

Claim Interpretation

35 U.S.C. 112, sixth paragraph

8. Claim 3, from which claims 4-7 depend and claim 18 from which claims 19-21 depend are written using means-plus- function language to define the "means for migrating the stretched nucleotide probes toward a pair of adjacent electrodes of the scanning electrodes by dielectrophoresis" (claims 3-7) and "means for immobilizing the stretched nucleotide probes between the energized scanning electrode and second scanning electrode" (claims 18-21). Therefore, the said claims are evaluated under 35 U.S.C. 112, Sixth Paragraph.

'The M PEP § 2181-2184 provides guidance for claim evaluation and examination under 35 U.S.C. 112, Sixth Paragraph as set forth below:

The USPTO must apply 35 U.S.C. 112, sixth paragraph in appropriate cases, and give claims their broadest reasonable interpretation, in light of and consistent with the written description of the invention in the application. See Donaldson, 16 F.3d at 1194, and 29 USPQ2d at 1850 (stating that 35 U.S.C. 112, sixth paragraph "merely sets a limit on how broadly the PTO may construe means-plus-function language under the rubric of reasonable interpretation". The Federal Circuit has held that applicants (and reexamination patentees) before the USPTO have the opportunity and the obligation to define their inventions precisely during proceedings before the PTO. See In re Morris, 127 F.3d 1048, 1056-57, 44 USPQ2d 1023, 1029-30 (Fed. Cir. 1997).

> A claim limitation will be presumed to invoke 35 U.S.C. 112, sixth paragraph, if it meets the following 3-prong analysis:
> (A) the claim limitations must use the phrase "means for" or "step for; "
> (B) the "means for" or "step for" must be modified by functional language; and

> (C) the phrase “means for" or "step for" must not be modified by sufficient structure, material, or acts for achieving the specified function. (see MPEP § 2181(I)).

9. In the instant case the “means” as recited in claim 3 does not meet the third criteria of the 3-prong analysis, viz., the claim language is modified by sufficient structure for achieving the function, i.e., means for migrating stretched nucleotide probes toward a pair of adjacent electrodes of the scanning electrodes are bridged by nucleotide probes immobilized between the adjacent electrodes by dielectrophoresis.

10. The “means” as recited in claim 18 meet the three-prong test and therefore will be interpreted in light of the “means” disclosed in the specification. The instant specification defines the means as AC electric filed (see instant specification, USPGPUB NO. paragraph 0014, instant claim 21).

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 24-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Washizu et al (IEEE transactions on Industry Applications, 1995, 31, 447-456, cited in IDS filed November 2, 2006).

Regarding claim 24, Washizu et al teaches a device, comprising a reaction region (Fig. 10a, Reaction region -space between two energization electrodes).

Washizu et al further teaches counter electrodes (i.e., energization electrode, Washizu also refers counter electrodes as outermost electrode, pg. 451, column 2, paragraph 2, line 3) each of the counter electrodes having a first surface facing the reaction region (Fig. 10a).

Washizu et al also teaches floating potential electrodes dispersed in a matrix layout between the counter electrodes (Fig. 10a, pg. 451, column 2, paragraph 2) and each of the floating potential electrodes having a second surface facing the reaction region (Fig. 10c), wherein the second surface is narrower than the first surface (Fig. 10, See the dimension of the counter and floating potential electrode in 10a).

Claim 24 has been rejected based on the structural components of the device rather than intended use of the device. Applicants are reminded that the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use then it meets the claim (MPEP 2114). In the instant case, Washizu et al teaches a reaction region, which can be configured for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes as claimed.

Regarding claim 25, Washizu et al teaches that the floating-potential electrodes have a shape being capable of generating a dielectrophoresis to stretch the DNA (pg. 451, column 2, paragraph 3, lines 8-11) as being reasonably interpreted as floating-

potential electrodes have a shape being capable of generating non-uniform electric field.

Regarding claim 26, as described in rejecting claim 24, Washizu et al teaches that the surfaces of the floating potential electrodes smaller than that of the counter electrodes (pg. 451, column 2, paragraph 3, lines 8-11).

Regarding claim 27, Washizu et al teaches that the surfaces of the floating-potential electrodes are treated with dielectrophoretic filed for immobilizing the nucleotides probes (pg. 451, column 2, and paragraph 3, lines 8-11).

Regarding claim 28, Washizu et al teaches that the counter electrodes are aligned in parallel with each other (Fig. 10a).

Regarding claim 29, Washizu et al teaches that non-uniform electric field is generated by the counter electrodes includes an alternating electric field (Fig. 10a).

Regarding claim 30, Washizu et al teaches a hybridization detector comprising glass substrate (Fig. 10a, pg. 451, column 2, paragraph 3, line 2), reaction region (Fig. 10a, Reaction region -space between two energization electrodes) and a detection surface for detecting DNA stretching between floating potential electrodes ((Fig. 11, pg. 451, column 2, paragraph 4), which is defined as a sensor chip comprising the hybridization detector in the instant specification (Instant specification, USPGPUB, paragraph 0041).

13. Claims 24-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Austin et al (USPN 6,203,683 issued Mar. 20, 2001).

Regarding claim 24, Austin et al teaches a hybridization detector comprising following structural components: a reaction region (Fig. 3, # 48), counter electrodes (Fig. 3, # 50), an array of floating potential electrodes, i.e., trapping electrodes (Fig. 3, # 18 and column 7, lines 23-26). The details of structural components are discussed below.

Regarding reaction region, Austin et al teaches a channel (i.e., a reaction region) (Fig. 3, # 48 and column 2, lines 45-48, column 5, lines 19-20, column 7, line 60).

Regarding counter electrodes, Austin et al teaches that counter electrodes, i.e., field electrodes are disposed in the reaction region (Fig. 3, # 50 and column 5, line 20, column 7, line 57) and further teaches that they are positioned to provide a dielectrophoretic field at the trapping electrodes (column 4, lines 14-17). Austin et al further teaches that the counter electrodes comprise length greater than the width of the channel of about 10 cm and a thickness of about 250 micrometer (column 4, lines 14-29), thus teaching a surface area of the counter electrode of 25 mm2 (length =100 mm x width = 0.25 mm). Combined teachings of Austin et al about surface area of the counter electrode and capability of generating dielectrophoretic field to move the nucleic acid towards trapping electrodes are reasonably interpreted as each of the counter electrode having a first surface facing the reaction region.

Regarding floating electrodes (Austin et al refers them also as trapping electrodes, column 3, lines 66-67), Austin et al teaches that electrodes are dispersed in a matrix lay out (i.e., in an array format) between the counter electrodes (Fig. 3, wire # 18, counter electrodes # 50 and column 5, lines 22-25, column 7, lines 23-26) are

made of metal and are for dielectrophoresis (column 3, lines 66-67, column 4, lines 1-2) to trap the target nucleic acids (column 5, lines 22-31). Instant specification describes floating potential electrode as conductive and is not connected to the outer power source (Instant specification, USPGPUB, paragraph 40). The wire electrode of Austin et al is the floating potential electrode of the instant claim because it is made of metal, i.e., conductive and not connected to an outer power source (Fig. 3).

Austin et al further teaches trapping the nucleic acids in the reaction region by dielectrophoretic field generated by counter electrode (column 5, lines 16-31), wherein the electrodes have a length smaller than the width of the channel of about 2 cm and a thickness of about 100 nanometers (column 3, lines 50-67) and is perpendicular to the reaction region (column 4, lines 8-9), thus teaching a surface area of the floating potential electrode of 0.002 mm2 (length =20 mm x width = 0.0001 mm). Combined teachings of Austin et al about surface area of the floating potential electrode and capability to trap nucleic acid in response to dielectrophoretic field generated by counter electrode are reasonably interpreted as each of the floating potential electrode having a second surface facing the reaction region.

As described above, Austin et al also teaches that the second surface is 0.002 mm2 and the first surface is 25 mm2, which meets the limitation of second surface is narrower (i.e., smaller) than the first surface.

Regarding claim 25, Austin et al teaches that the floating-potential electrodes have a shape being capable of generating a non-uniform electric field (column 3, lines 66-67, column 4, line 1 and column 6, lines 35-40).

Regarding claim 26, as described in rejecting claim 24, Austin et al teaches that the second surface is 0.002 mm2 and the first surface is 25 mm2, which meets the limitation of second surface is smaller than the first surface.

Regarding claim 27, Austin et al teaches that the surfaces of the floating-potential electrodes are treated with dielectrophoretic filed for immobilizing the nucleotides probes (column2, lines 40-52).

Regarding claim 28, Austin et al teaches that the counter electrodes are aligned in parallel with each other (Fig. 3, # 50).

Regarding claim 29, Austin et al teaches that the non-uniform electric field, i.e., dielectrophoretic field generated by the counter electrodes includes an alternating electric field (Fig. 3, column 5, lines 20-29, column 6, lines 3-6).

Regarding claim 30, Austin et al teaches a sensor chip comprising the hybridization detector of claim 24 comprising quartz substrate (Fig. 3, # 10 and column 4, line 58), a reaction region (Fig. 3, # 48) and a detection surface (Fig. 3, # 18 and Fig. 8, column 8, lines 65-67, column 9, lines 1-23).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 3-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zenhausern et al (USPGPUB NO. US 2004/0011650 filed Jul. 22, 2002) in view of Washizu et al (IEEE transactions on Industry Applications, 1995, 31, 447-456).

Regarding claim 3, Zenhausern et al teaches a sensor chip comprising following structural components: a reaction region (Fig. 2, # 400), counter electrodes (Fig. 2, # 420 and 421), scanning electrodes (Fig. 2, # 430) and a power source (paragraph 0014).

Regarding a reaction region, Zenhausern et al teaches a channel (i.e., a reaction region), for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes (Fig. 2, # 400, paragraphs 0014 and 0252).

Regarding counter electrodes, Zenhausern et al teaches field generating electrodes (i.e., counter electrodes) for generating an electric field (Fig. 2, # 420 and

421, paragraphs 0014 and 0252). Zenhausern et al are silent about stretching nucleotide probes.

Regarding scanning electrodes, Zenhausern et al teaches a plurality of floating electrodes (i.e., scanning electrodes) arrayed in the reaction region comprising capture probes (Fig. 2, # 430, paragraphs 0014 and 0252). Instant specification describes scanning electrode means a group of arrayed electrodes to which a voltage is applied sequentially (Instant specification, USPGPUB, paragraph 0039). Zenhausern et al also teaches that electric field is applied sequentially on a plurality of floating electrodes in the reaction region (paragraph 0117). Therefore, floating electrodes of Zenhausern et al are reasonably interpreted as scanning electrode.

Zenhausern et al further teaches a power source for generating asymmetrical, oscillating electric field to manipulate analytes by dielectrophoresis (Figs. 3 and 4, paragraphs 0052-0059 and 0252-0254). Zenhausern et al teaches dielectrophoresis means for migrating nucleic acids towards adjacent electrodes by a non-uniform electric filed (paragraphs 0024-0025). Zenhausern et al teaches that scanning electrodes comprise capture probes (paragraph 0252, lines 30-32), but are silent about adjacent electrodes are bridged by nucleotide probes immobilized between the adjacent electrodes.

Regarding claim 4, Zenhausern et al teaches that the floating potential electrodes (i.e., scanning electrodes) are immobilized with the nucleotide probes (paragraphs 0206 and 0252) and hybridizes to target sequence (paragraph 0033). Adjacent electrodes of

the scanning electrodes are interpreted broadly as part of a plurality of scanning electrodes taught by Zenhausern et al.

Regarding claim 5, Zenhausern et al teaches that the scanning electrodes have polygonal ends (paragraphs 0055 and 0252).

Regarding claim 6, Zenhausern et al teaches that the counter electrodes are disposed so as to oppose each other and be in parallel with each other (Fig. 2, counter electrodes #s 420 and 421, paragraph 0252).

Regarding claim 8, Zenhausern et al teaches a sensor chip comprising a reaction region (Fig. 2, # 400), a common electrode (Fig. 2, # 420 and 421), scanning electrodes (Fig. 2, # 430) and power source (paragraph 0014). Details of structural components are discussed below.

Zenhausern et al teaches a channel (i.e., a reaction region) for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes (Fig. 2, # 400, paragraphs 0014 and 0252).

Zenhausern et al also teaches a field generating electrode, i.e., a common electrode disposed in the reaction region (Fig. 3, # 510, paragraph 0254) and further teaches floating electrodes (i.e., scanning electrodes) aligned in parallel (Fig. 3, See the parallel arrangement of scanning electrodes # 501 and # 505; # 502 and # 504, paragraph 0254). Instant specification describes scanning electrode means a group of arrayed electrodes to which a voltage is applied sequentially (Instant specification, USPGPUB, paragraph 0039). Zenhausern et al also teaches that electric field is applied sequentially on a plurality of floating electrodes in the reaction region (paragraph 0117).

Therefore, floating electrodes of Zenhausern et al are reasonably interpreted as scanning electrode.

Zenhausern et al also teaches a power source (i.e., an electric filed generator, paragraphs 0014, 0270) and an AC voltage (paragraph 0254) for its intended use for energizing the common electrodes by sequentially applying a voltage between the common electrode and the energized scanning electrode to generate an electric filed in the reaction region (paragraph 0117). Zenhausern et al further teaches a power source for generating asymmetrical, oscillating electric field to manipulate analytes by dielectrophoresis (Figs. 3 and 4, paragraphs 0052-0059 and 0252-0254). Zenhausern et al also teaches applying electric filed sequentially to a plurality of electrodes to control the movement of sample components (paragraph 0117) thus encompassing an electric filed generator energizing the common electrode and scanning electrode by sequentially applying a voltage between the common electrode and the energized second electrode to generate an electric filed in the reaction region.

Zenhausern et al teaches dielectrophoresis means for migrating nucleic acids towards energized scanning electrode in response to a the electric filed (paragraphs 0024-0025).

Zenhausern et al teaches that scanning electrodes comprise capture probes (paragraph 0252, lines 30-32), but are silent about bridging the energized scanning electrode and the second scanning electrode adjacent to the energized scanning electrode by nucleotide probes immobilized between them.

Regarding claim 9, Zenhausern et al teaches a field generating electrode, i.e., a common electrode (Fig. 3, #510) and the floating electrodes (i.e., scanning electrodes; Fig. 3, # 501). Zenhausern et al also teaches that the scanning electrodes are aligned in two lines and an end of the scanning electrodes in one line opposes an end of the scanning electrodes in the other line (Fig. 4, See the alignment of electrodes 530 and 531, paragraph 0254).

Regarding claim 10, Zenhausern et al teaches a plurality of scanning electrodes are disposed so that the distances between the opposing scanning electrodes increase stepwise in the direction that a voltage is sequentially applied (paragraphs 0117 and 0254).

Regarding claim 11, Zenhausern et al teaches that the energized scanning electrode and the second scanning electrode are immobilized with the nucleotide probes (paragraphs 0206 and 0252) and further teaches the manipulation of analytes, i.e., targets via dielectrophoresis and hybridization of targets to the probe and detecting target analytes (paragraphs 0014-0015, 0024-0026 and 033) but are silent about target nucleotide sequences are in a stretched form.

Regarding claim 12, Zenhausern et al teaches that the floating electrodes, i.e., scanning electrodes have polygonal ends (paragraphs 0055 and 0252).

Regarding claim 14, Zenhausern et al teaches a sensor chip comprising a reaction region (Fig. 2, # 400), a plurality of scanning electrodes (Fig. 2, # 430, paragraph 0014) and power source (paragraph 0014). Details of the structural components of the sensor chip are discussed below.

Zenhausern et al teaches a channel (Fig. 2, # 400, paragraphs 0014 and 0252), i.e., a reaction region for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes. Zenhausern et al also teaches a plurality of floating electrodes (Fig. 3, #s 501-505, and paragraph 0254), i.e., first scanning electrodes arrayed in the reaction region; second scanning electrodes arrayed so that the ends of the second scanning electrodes oppose the respective ends of the first scanning electrodes (Fig. 4, #s 530 and 531, paragraph 0254 and 272). Zenhausern et al also teaches a power source (i.e., an electric filed generator, paragraphs 0014, 0270) and an AC voltage (paragraph 0254) for its intended use for energizing the common electrodes by sequentially applying a voltage between the common electrode and the energized scanning electrode to generate an electric filed in the reaction region. Zenhausern et al further teaches a power source for generating asymmetrical, oscillating electric field to manipulate analytes by dielectrophoresis (Figs. 3 and 4, paragraphs 0014-0015, 0024-0026, 0052-0059 and 0252-0254).

Zenhausern et al teaches dielectrophoresis means for migrating nucleic acids towards energized scanning electrode in response to a the electric filed (paragraphs 0024-0025 and 0052) and further teaches that scanning electrodes comprise capture probes (paragraph 0252, lines 30-32), thus teaching first and second groups of probes immobilized on first and second scanning electrodes. Zenhausern et al are silent about bridging of the adjacent electrodes with nucleotide probes.

Regarding claim 15, Zenhausern et al teaches that the scanning electrode are immobilized with the nucleotide probes (paragraphs 0206 and 0252) and further teaches the manipulation of analytes, i.e., targets via dielectrophoresis and hybridization of targets to the probe and detecting target analytes (paragraphs 0014-0015, 0024-0026 and 033).

Regarding claim 16, Zenhausern et al teaches that the floating electrodes, i.e., scanning electrodes have polygonal ends (paragraphs 0055 and 0252).

Regarding claim 18, Zenhausern et al teaches a sensor chip comprising a reaction region (Fig. 2, # 400), a common electrode (Fig. 2, # 420 and 421), scanning electrodes (Fig. 2, # 430) and power source (paragraph 0014). Details of the structural components of the sensor chip are discussed below.

Zenhausern et al teaches a channel (i.e., a reaction region) for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes (Fig. 2, # 400, paragraphs 0014 and 0252). Zenhausern et al further teaches a field generating electrode (i.e., a common electrode) disposed in the reaction region (Fig. 3, # 510) and a plurality of floating electrodes (i.e., scanning electrodes) arrayed in the reaction region so that the ends of the scanning electrodes oppose the common electrode (Fig. 3, #s 501-505, paragraph 0254).

Zenhausern et al also teaches a power source (i.e., an electric filed generator, paragraphs 0014, 0270) and an AC voltage (paragraph 0254) for its intended use for energizing the common electrodes by applying a voltage between the common electrode and one of the scanning electrode to generate an electric filed in the reaction

region. Zenhausern et al further teaches a power source for generating asymmetrical, oscillating electric field to manipulate analytes by dielectrophoresis (Figs. 3 and 4, paragraphs 0014-0015, 0024-0026, 0052-0059 and 0252-0254). Zenhausern et al also teaches that voltage is applied to the floating electrode, i.e., scanning electrode (paragraph 0254), which is defined in the instant specification as energizing the scanning electrode (instant specification, paragraph 0014).

Zenhausern et al teaches that scanning electrodes comprise capture probes and further teaches dielectrophoresis means for migrating nucleic acids towards energized scanning electrode in response to a the electric filed and hybridization of target to the probes (paragraphs 0024-0025 and 0033). Zenhausern et al are silent about stretching the nucleotide probes and bridging of the energized scanning electrode and the second scanning electrode adjacent to the energized scanning electrode.

Regarding claim 19, Zenhausern et al a device wherein scanning electrodes comprise probes and further teaches the manipulation of analytes via dielectrophoresis and hybridization of target to the probe and detecting target analytes (paragraphs 0014-0015, 0024-0026 and 0033) but are silent about stretched target nucleotide sequences.

Regarding claim 20, Zenhausern et al teaches that the floating electrodes, i.e., scanning electrodes have polygonal ends (paragraphs 0055 and 0252).

Regarding claims 7, 17, 21 and 29, Zenhausern et al teaches that non-uniform electric field includes an alternating current electric field (paragraph 0254).

As described above, regarding claims 3, 8, 14 and 18, Zenhausern et al are silent about stretching nucleotide probes and bridging adjacent electrodes.

However, stretching nucleotide probes and bridging the adjacent electrodes were known in the art at the time of the claimed invention was made as taught by Washizu et al.

Washizu et al teaches a device for stretching DNA, comprising counter electrodes for generating an electric field for stretching the nucleotide probes in the reaction region (Fig. 10a, Counter electrodes are labeled as Energization electrodes, pg. 451, column 2, paragraph 2). Washizu also teaches floating potential electrodes are arrayed in the reaction region (Fig. 10c) and the nucleic acid between adjacent floating potential electrodes is stretched and bridges the floating potential electrodes by dielectrophoresis (Fig. 10c, pg. 451, column 2, and paragraph 3).

Washizu et al also teaches that stretching of nucleic acid probes between adjacent electrodes allows controlled position and location of the nucleic acid thereby enabling physical observations, measurements and operations of DNA and opening the way to a novel category of “molecular biochemistry with spatial resolution” (pg. 455, column 1, paragraph 4).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to modify the nucleotide probe configuration of Zenhausern et al with stretched nucleotide probe configuration of Washizu et al with a reasonable expectation of success.

An artisan would have been motivated to modify the nucleotide probe configuration of Zenhausern et al with the expected benefit of stretching of nucleic acid probes between adjacent electrodes allowing one to control the position and location of the nucleic acid enabling physical observations, measurements and operations of DNA and opening the way to a novel category of "molecular biochemistry with spatial resolution" as taught by Washizu et al (pg. 455, column 1, paragraph 4).

Double Patenting

17. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

18. Claims 3-21 and 24-30 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-12 and 14-16 of copending Application No. 11/221,940 in view of Zenhausern et al (USPGPUB NO.

US 2004/0011650 filed Jul. 22, 2002). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons.

Regarding instant claims 3, 8, 14, 18 and 24 the claims 1 and 11 of the '940 copending application are drawn to a hybridization detecting unit comprising a reaction region, opposed electrodes (i.e., counter electrodes) for generating electric field and AC electric field generator for inducing dielectrophoresis. The claims of '940 copending application are not drawn to scanning electrodes. However, scanning electrodes arrayed in the reaction region for dielectrophoresis means are taught by Zenhausern et al.

Zenhausern et al teaches a sensor chip comprising a reaction region (Fig. 2, # 400), counter electrodes (Fig. 2, # 420 and 421), scanning electrodes (Fig. 2, # 430), a power source (paragraph 0014) and a dielectrophoresis means for migrating nucleotide probes toward a plurality of adjacent electrodes of the scanning electrodes by a non-uniform electric filed (Abstract, paragraph 0023). Zenhausern et al teaches scanning electrodes and dielectrophoresis means improves the detection of target analytes by concentrating targets and washing of contaminants (paragraphs 0015 and 0023).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to modify the electrodes of '940 copending application with scanning electrodes and dielectrophoresis means of Zenhausern et al with the expected benefit of improving the detection of target analytes by concentrating targets and washing of contaminants (paragraphs 0015 and 0023).

It is also noted that Zenhausern et al further discloses additional limitations required by dependent claims 4-7, 9-13, 15-21 and 25-30 as described in detail in this office action in section 16 and therefore their embodiments are obvious over claims 1-12 and 14-16 of the '940 copending application in view of Zenhausern et al.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to remarks from the Applicants

Rejections under 35 U.S.C. § 102(b)

19. Applicant's arguments filed September 29, 2008 with respect to claims 24-28 and 30 being anticipated by Zenhausern et al (Remarks, pgs. 11-12) have been fully considered but are moot in view of withdrawal of the rejection and new grounds of rejection set forth in this office action in view of claim amendments.

Rejections under 35 U.S.C. § 103(a)

20. Applicant's arguments filed September 29, 2008 with respect to claims 3-21 as being unpatentable over Zenhausern et al, Sato et al and Eichen et al have been fully considered but are moot in view of withdrawal of the rejection and new grounds of rejection set forth in this office action in view of claim amendments.

Double Patenting

21. Non statutory obviousness-type double patenting rejection over claims of copending '940 application is maintained because Applicants have not traversed the rejection. Applicants have indicated that since double patenting rejections are provisional, they will address the rejections at the time of issue of patents of the instant and/or co-pending applications (Remarks, pg. 17, last paragraph).

Non statutory obviousness-type double patenting rejections over claims of copending '977 application is withdrawn in view of claim amendments.

Conclusion

22. No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Narayan K. Bhat whose telephone number is (571)-272-5540. The examiner can normally be reached on 8.30 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram R. Shukla can be reached on (571)-272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Narayan K. Bhat/

Examiner, Art Unit 1634

/BJ Forman/

Primary Examiner, Art Unit 1634